User Manual

Airport Runway Optimization Database (AROD)

Version 1.0

June 2009

Introduction

The Airport Runway Optimization Database (AROD) aims to simplify organizing, searching, and finding documents and corresponding notes related to airport runway optimization research. AROD was developed using Microsoft Office Access 2003 and the database is in Access 2003 format.

How to Use the Program

Step 1: Run the Airport Runway Optimization Database (AROD)

The AROD is distributed on a CD. To run the program on your PC, open the "AROD-V1.mdb" file from CD-Drive. After double clicking on the file, one or some of the security warnings below may appear.

a) Click "No" in this case (Figure 1).

Figure 1: Security Warning 1

b) Click "Yes" in this case (Figure 2).

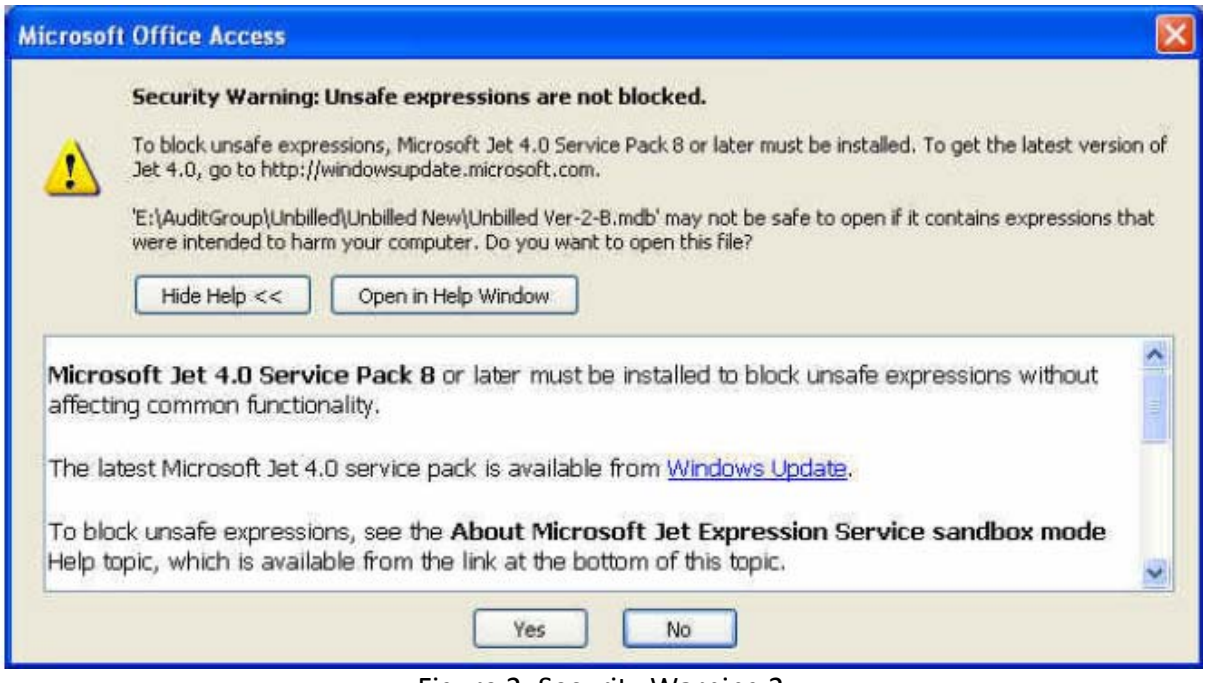
Microsoft Office Access
Security Warning: Unsafe expressions are not blocked.
To block unsafe expressions, Microsoft Jet 4.0 Service Pack 8 or later must be installed. To get the latest version of Jet 4.0, go to http://windowsupdate.microsoft.com.
'E:\AuditGroup\Unbilled\Unbilled New\Unbilled Ver-2-8.mdb' may not be safe to open if it contains expressions that were intended to harm your computer. Do you want to open this file?
Hide Help <<
Open in Help Window
Microsoft Jet 4.0 Service Pack 8 or later must be installed to block unsafe expressions without affecting common functionality.
The latest Microsoft Jet 4.0 service pack is available from Windows Update.
To block unsafe expressions, see the About Microsoft Jet Expression Service sandbox mode Help topic, which is available from the link at the bottom of this topic.
Yes
No

Figure 2: Security Warning 2

c) Click “Open” in this case (Figure 3) to open the database.

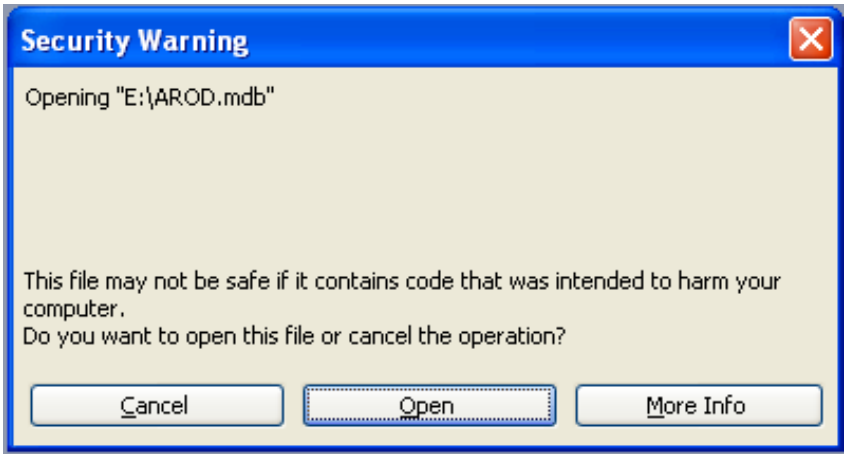
Security Warning
Opening "E:\AROD.mdb"
This file may not be safe if it contains code that was intended to harm your computer.
Do you want to open this file or cancel the operation?
Cancel
Open
More Info

Figure 3: Security Waning 3

In the next step, the following window (Figure 4) appears showing the main panel form. It includes four options: All Records, Add New Document, Search, and Quit.

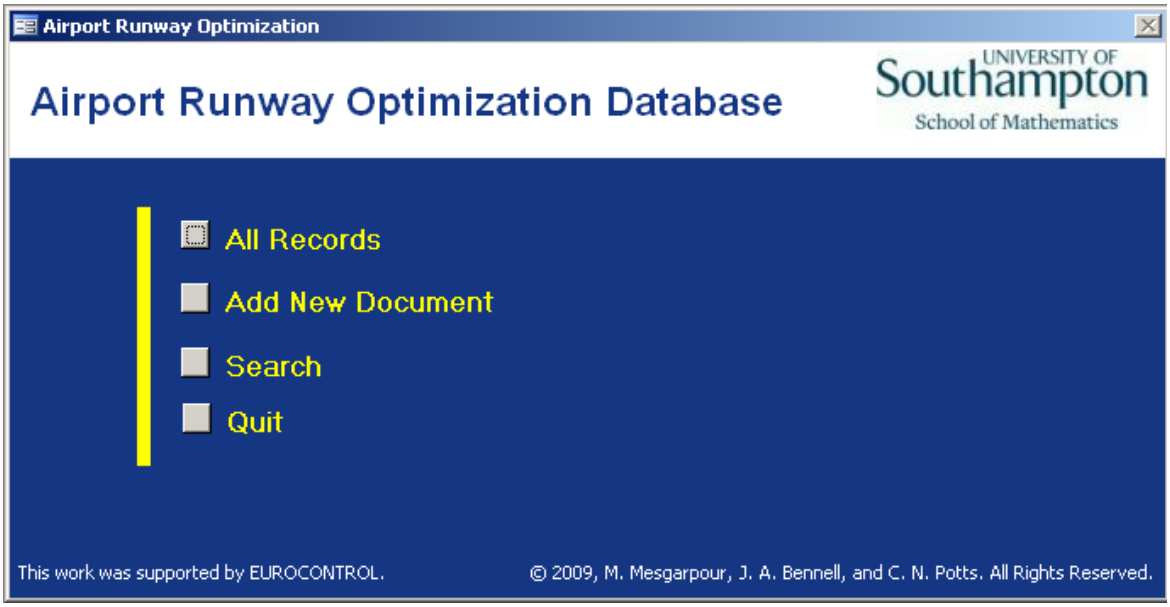
Airport Runway Optimization
Airport Runway Optimization Database
UNIVERSITY OF Southampton
School of Mathematics
All Records
Add New Document
Search
Quit
This work was supported by EUROCONTROL.
© 2009, M. Mesgarpour, J. A. Bennell, and C. N. Potts. All Rights Reserved.

Figure 4: Main Panel Form

By selecting “All Records” option, all documents will be displayed (Figure 5). If the “Add New Records” option is selected, user can add a new document into the database (Figure 6). “Search” option enables user to search on the database based on different search criteria (Figure 7). Finally, “Quit” option will close the AROD program.

Step 2: Browse All the Document

If the user clicks on button “All Records”, he/she will transfer to an all documents form (Figure 5) which displays all the documents page by page. The user can switch between the documents by navigation buttons on top of the screen. Moreover, documents can be edited or deleted. There is a link between each record and the softcopy of the document. Depending on the copyright, the first page or the whole document is accessible. In addition, a Note file is attached to each document which includes a brief information and highlighted points. The softcopy of the document and the Note files can be displayed by clicking on button “Open Document” and button “Open Comment”, respectively.

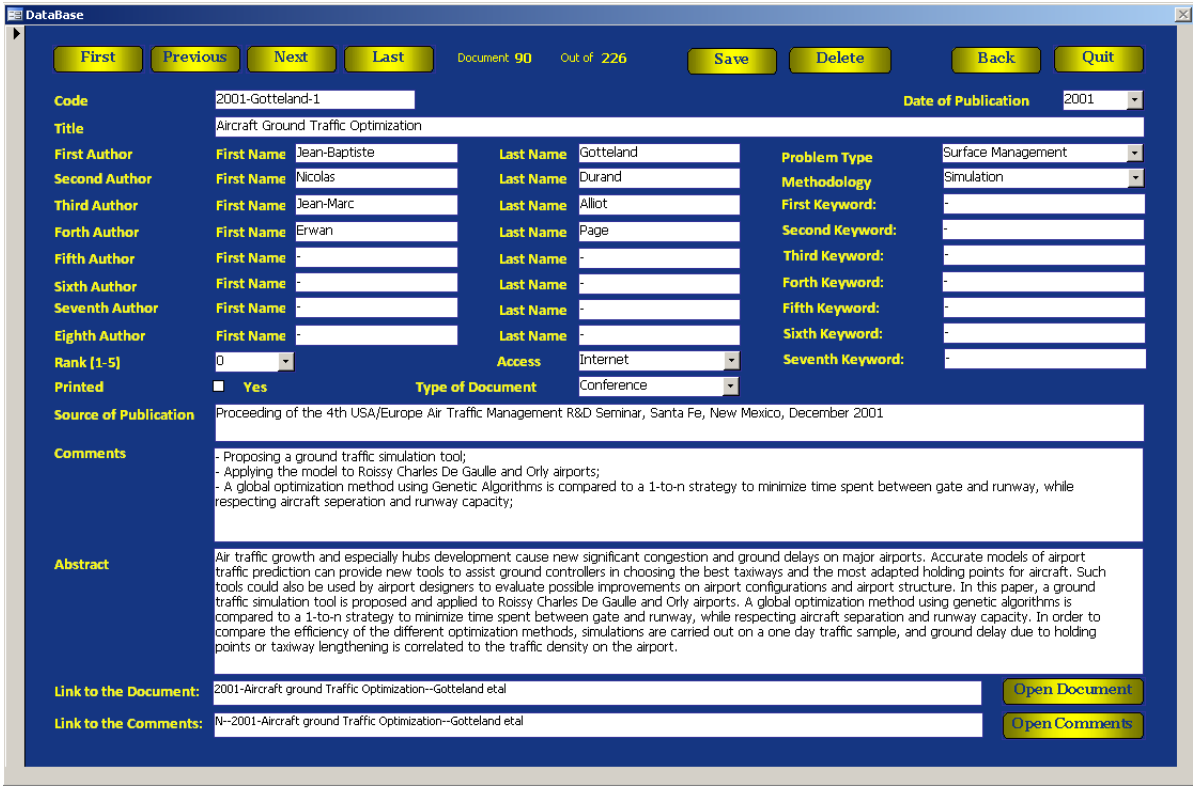
DataBase
First
Previous
Next
Last
Document 90
Out of 226
Save
Delete
Back
Quit
Code
2001-Gotteland-1
Date of Publication
2001
Title
Aircraft Ground Traffic Optimization
First Author
First Name
Jean-Baptiste
Last Name
Gotteland
Problem Type
Surface Management
Second Author
First Name
Nicolas
Last Name
Durand
Methodology
Simulation
Third Author
First Name
Jean-Marc
Last Name
Alliot
First Keyword:
Forth Author
First Name
Erwan
Last Name
Page
Second Keyword:
Fifth Author
Third Keyword:
Sixth Author
Forth Keyword:
Seventh Author
Fifth Keyword:
Eighth Author
Sixth Keyword:
Rank [1-5]
Access
Internet
Seventh Keyword:
Printed
Yes
Type of Document
Conference
Source of Publication
Proceeding of the 4th USA/Europe Air Traffic Management R&D Seminar, Santa Fe, New Mexico, December 2001
Comments
- Proposing a ground traffic simulation tool;
- Applying the model to Roissy Charles De Gaulle and Orly airports;
- A global optimization method using Genetic Algorithms is compared to a 1-to-n strategy to minimize time spent between gate and runway, while respecting aircraft seperation and runway capacity;
Abstract
Air traffic growth and especially hubs development cause new significant congestion and ground delays on major airports. Accurate models of airport traffic prediction can provide new tools to assist ground controllers in choosing the best taxiways and the most adapted holding points for aircraft. Such tools could also be used by airport designers to evaluate possible improvements on airport configurations and airport structure. In this paper, a ground traffic simulation tool is proposed and applied to Roissy Charles De Gaulle and Orly airports. A global optimization method using genetic algorithms is compared to a 1-to-n strategy to minimize time spent between gate and runway, while respecting aircraft separation and runway capacity. In order to compare the efficiency of the different optimization methods, simulations are carried out on a one day traffic sample, and ground delay due to holding points or taxiway lengthening is correlated to the traffic density on the airport.
Link to the Document:
2001-Aircraft ground Traffic Optimization--Gotteland etal
Open Document
Link to the Comments:
N--2001-Aircraft ground Traffic Optimization--Gotteland etal
Open Comments

Figure 5: All Records Form

Step 3: Add a New Document

“Add New Records” form (Figure 6) enables the user to add a new document to the database.

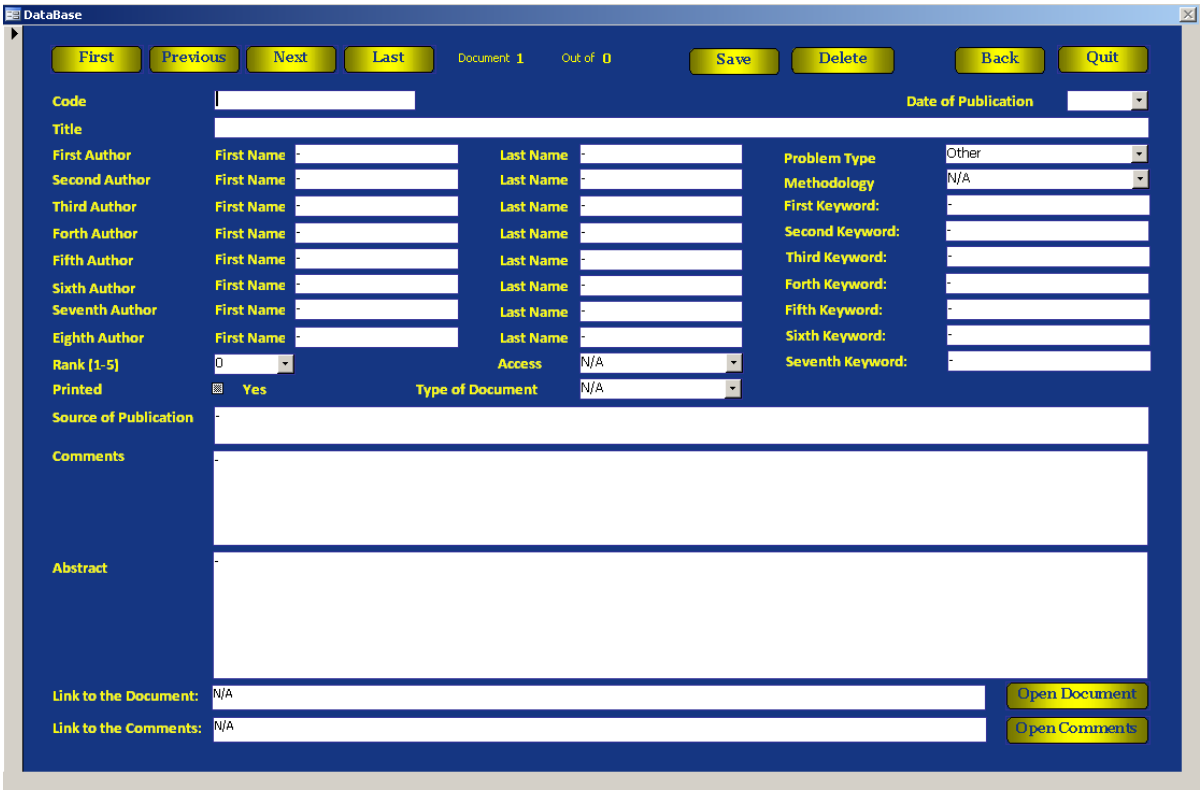

Figure 6: Ádd New Document Form

Step 4: Search

The user can search in the database by defining search keywords in the search form (Figure 7). If the user leaves any field blank, it means that there is no preference regarding to the specified search criteria.

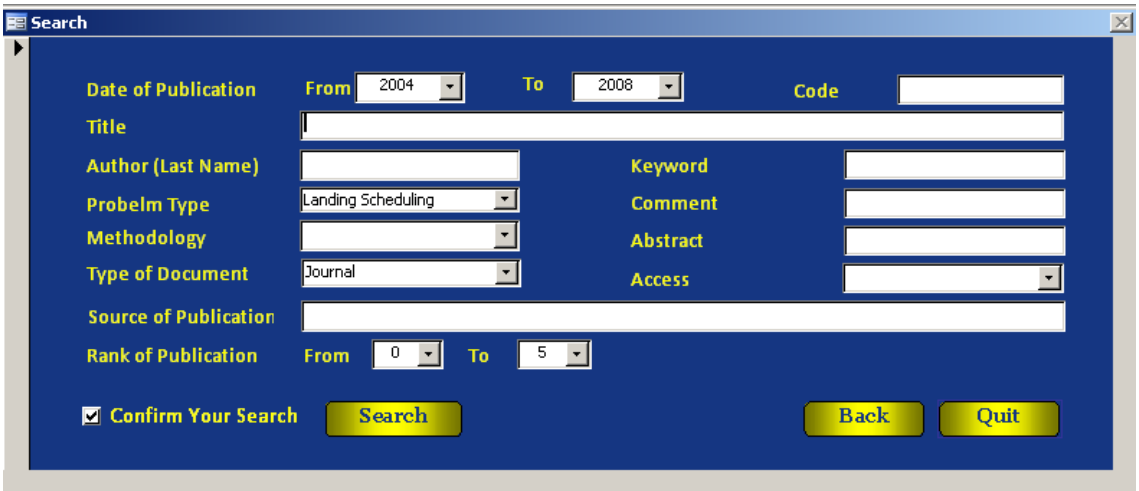

Figure 7: Search Form

The search results will be displayed on the search result form (Figure 8). Button “Preview” and Button “Print” enable user to view and print out the summary of the search results, respectively.

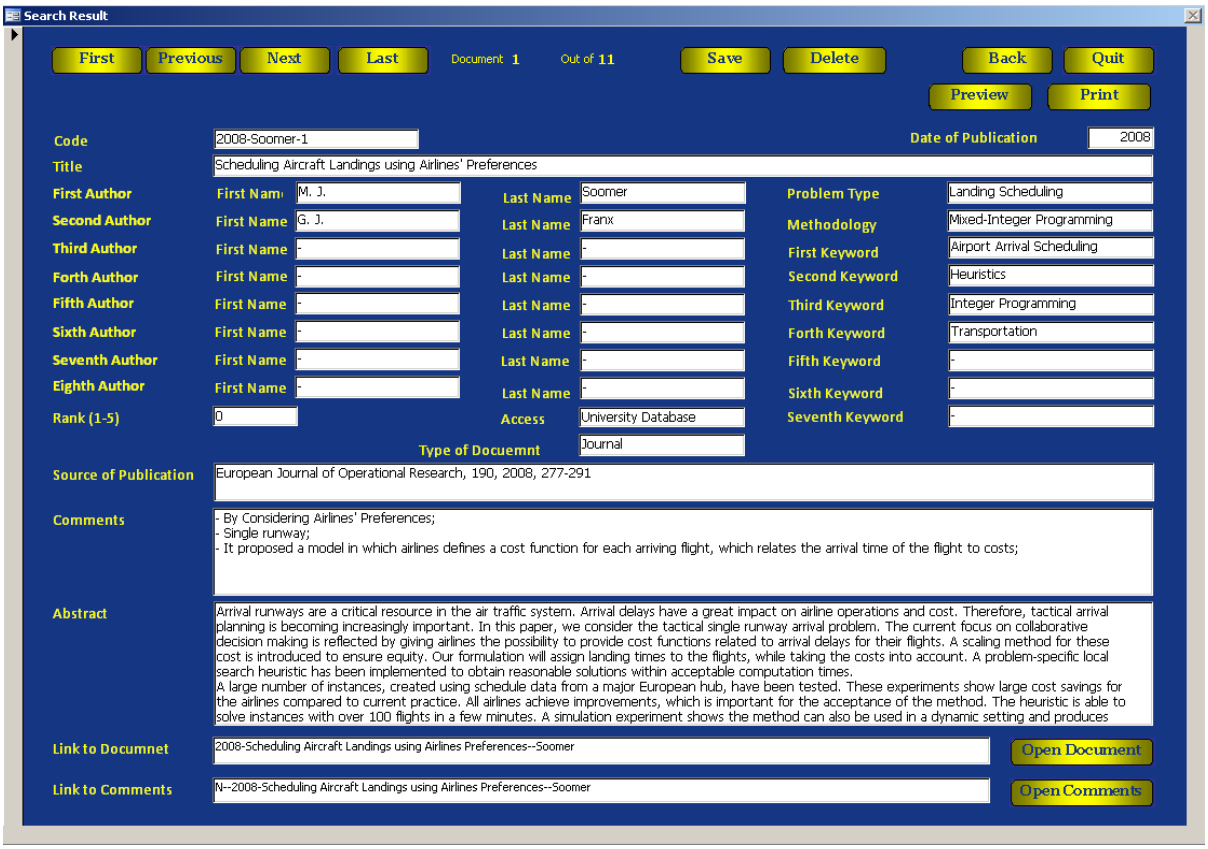
Search Result
First
Previous
Next
Last
Document 1
Out of 11
Save
Delete
Back
Quit
Preview
Print
Code
2008-Soomer-1
Date of Publication
2008
Title
Scheduling Aircraft Landings using Airlines' Preferences
First Author
First Nam
M. J.
Last Name
Soomer
Problem Type
Landing Scheduling
Second Author
First Name
G. J.
Last Name
Franx
Methodology
Mixed-Integer Programming
Third Author
First Name
-
Last Name
-
First Keyword
Airport Arrival Scheduling
Forth Author
First Name
-
Last Name
-
Second Keyword
Heuristics
Fifth Author
First Name
-
Last Name
-
Third Keyword
Integer Programming
Sixth Author
First Name
-
Last Name
-
Forth Keyword
Transportation
Seventh Author
First Name
-
Last Name
-
Fifth Keyword
-
Eighth Author
First Name
-
Last Name
-
Sixth Keyword
-
Rank (1-5)
0
Access
University Database
Seventh Keyword
-
Type of Docuemnt
Journal
Source of Publication
European Journal of Operational Research, 190, 2008, 277-291
Comments
- By Considering Airlines' Preferences;
- Single runway;
- It proposed a model in which airlines defines a cost function for each arriving flight, which relates the arrival time of the flight to costs;
Abstract
Arrival runways are a critical resource in the air traffic system. Arrival delays have a great impact on airline operations and cost. Therefore, tactical arrival planning is becoming increasingly important. In this paper, we consider the tactical single runway arrival problem. The current focus on collaborative decision making is reflected by giving airlines the possibility to provide cost functions related to arrival delays for their flights. A scaling method for these cost is introduced to ensure equity. Our formulation will assign landing times to the flights, while taking the costs into account. A problem-specific local search heuristic has been implemented to obtain reasonable solutions within acceptable computation times.
A large number of instances, created using schedule data from a major European hub, have been tested. These experiments show large cost savings for the airlines compared to current practice. All airlines achieve improvements, which is important for the acceptance of the method. The heuristic is able to solve instances with over 100 flights in a few minutes. A simulation experiment shows the method can also be used in a dynamic setting and produces
Link to Documnet
2008-Scheduling Aircraft Landings using Airlines Preferences--Soomer
Open Document
Link to Comments
N--2008-Scheduling Aircraft Landings using Airlines Preferences--Soomer
Open Comments

Figure 8: Search Result Form

Step 5: Exit

If the user wants to quit the program, he/she have to click on the button “Quit”. The user can return to the main panel form by clicking on button “Back”.